SONY

NTSC PAL

BVP-360/360P

CAMERA SYSTEM

Product Information

Sony Broadcast

CONTENTS

Introduction 1
1. The Camera Head 2
   1-1 Camera head system configurations
   1-2 Functions and controls
   1-3 Basic block diagram
   1-4 Viewfinder
2. CCU-360/360P Camera Control Unit 6
   2-1 CCU System configurations
   2-2 Functions and controls
   2-3 Basic block diagram
   2-4 Connections
3. RCP Remote Control Panel 12
   3-1 RCP function chart
   3-2 RCP-3631 (Type-III) functions and controls
   3-3 RCP-3621/3620 (Type-II) functions and controls
4. Auto Setup System 20
   4-1 Concept of auto setup system
   4-2 Features of auto setup system
   4-3 Reference file system (Standard setup data system)
   4-4 Digital registration compensation
   4-5 File system and concept of camera setup
5. Triax Transmission 25
6. Superiority of F1.2 Prism System 26
7. BVP-360 Signal Processing 27
   7-1 Wide dynamic range
   7-2 Precise color adjustment
   7-3 Aperture correction and image enhancement
8. Intercom/Audio System 29
9. Application Systems 29
10. Product Configurations 30
11. Specifications 32

The BVP-360 —a New Generation of Studio/OB Camera

Recently television production has been developing in many diverse and expanding directions. Conventional studio and outside broadcast techniques have evolved to take advantage of a new lightweight camera and yet larger traditional cameras have many advantages in operational convenience.

For the first time Sony introduces a camera that can satisfy users with no compromise in performance—the BVP-360.

Sony has incorporated its unrivalled experience of high quality portable camera design to produce a very stable and reliable system yet with all the performance and facilities to satisfy the most demanding customers.

The performance of:

- *Sony's unique 2/3-inch MS tubes, developed to give resolution and geometry surpassing conventional larger tubes.*
- *An F1.2 optical system giving sensitivity and depth of field to match large cameras.*
- *Advanced video signal processing to give unmatched picture quality.*

The facilities of:

- *A comprehensive auto alignment system to ensure the highest quality pictures at the push of a button.*
- *An extensive memory system to store engineering and operational parameters for instant recall.*
- *Unique operator convenience to give superb ability to manipulate images.*
- *A very flexible and comprehensive system approach.*

BVP-360 Main Features

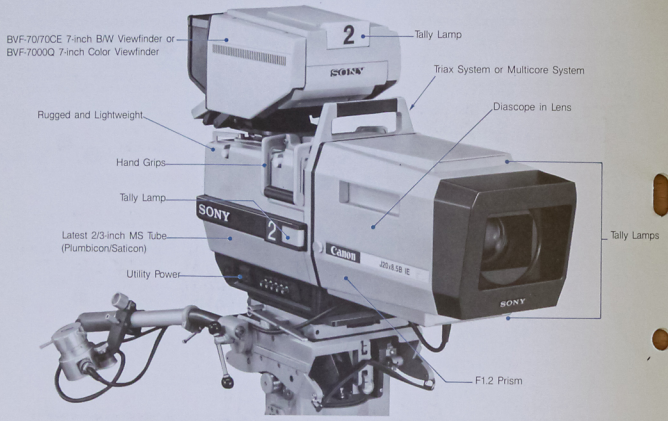
1. Latest pickup tube design
2. High picture performance
3. F1.2 optical system
4. Compact, lightweight and rugged construction
5. Automatic setup functions
6. Advanced triax transmission
7. High performance color viewfinder
8. Growing camera system

FULL STUDIO CAMERA APPLICATION

OUTSIDE BROADCAST CAMERA APPLICATION

EFP STAND ALONE APPLICATION

1. The Camera Head

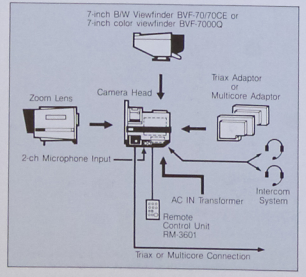


1-1 Camera head system configurations

The BVP-360 camera head is designed for maximum versatility. The basic design for the camera head is a self contained camera and this can be expanded to the most sophisticated multiple camera operation.

BVF-7000Q: Newly developed 7-inch color viewfinder.

BVF-70/70CE: High performance B/W 7-inch viewfinder.



Zoom lens: From ×14 to ×44 zoom lenses, a wide range of options are provided from all major lens manufacturers.

Adaptor: Interchangeable triax/multicore adaptors can be used.

Power block: Built-in type power block is standard to power camera head from camera cable. Utility power is available (100W) at the camera head on both multicore and triax.

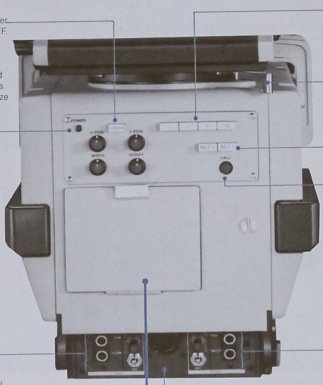
AC-IN transformer: In case for self contained camera operation without CCU, AC power can be utilized with this transformer.

Remote control unit (RM-3601): In case for self contained operation, this simple remote control unit can be used.

Intercom system: 2-channel (engineer use and program director use) intercom system is available. In addition, another intercom for tracker is available.

1-2 Functions and controls

• REAR PANEL



CURSOR: BOX CURSOR viewfinder indication can be switched ON/OFF. When pressed, box cursor is displayed in the viewfinder.

CURSOR CONTROL: H-POSI and V-POSI are cursor position controls. WIDTH and HEIGHT are cursor size controls.

POWER: Green lamp.

R, G, B, -G,: Test output selection buttons for registration adjustment.

PAN LOCK: Pull right to lock.

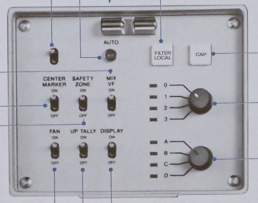
RET 2/1: Two channels of return video can be selected.

CALL: Call button to CCU and RCP. When this is pressed, tally lamp lights at CCU and RCP.

ENG: Engineer's communication system (double jack)
INCOM: Intercom system from CCU for engineer
PGM: Program audio from CCU
INCOM/PGM audio level control
Volume: Level adjustment is possible for INCOM/PGM
MIC: Intercom Microphone ON/OFF switch

PROD: Production communication system similar facility to ENG, for program director.

FAN: Ventilation fan for special shooting conditions.



AUTO: Red lamp lights when Auto Setup is activated.

SPARE SWITCH: For user's applications.

FILTER LOCAL: Filter Remote/Local selection.

MIX VF: Viewfinder picture and return video can be mixed at viewfinder for simultaneous observation.

CAP: Camera cap.

CENTER MARKER: Cross indication as a center marker.

ND FILTER: Switch selection of ND filters from 0 to 3.

SAFETY ZONE: Safety zone indication in the VF on/off switch.

CC FILTER: Switch selection of color filters from A to D.

FAN: Fan on/off switch.

UP TALLY: Tally at camera head ON/OFF switch.

DISPLAY: Camera status indication and warning indication in VF can be switched on/off.

• SIDE PANELS

RET OUT: Return video output to monitor.
Two channels of return video available from CCU.

PROMPT OUT: Prompter output is available with triax/multicore.

EXT VF OUT: The same signal which appears on the viewfinder is available for an external monitor.

VIDEO OUT: Encoded video output. (self contained camera operation)

REFERENCE: Gen lock input.

LENS (26-pin): Sony exclusive zoom lenses are directly connected to camera head. Any types of other lens can also be connected with this connector (option).

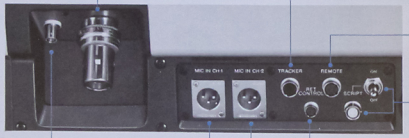
UTILITY: Utility power is available (100W) for engineer's convenience with both triax and multicore transmission. (option)

DC-IN (4-pin): External power supply is available for self contained field operation. (option)

VTR (26-pin): In addition to composite video output, RY/BY and Y component signals are available with the 26-pin connection.
For instance, Betacam recorder can be used directly. (option)

TRIAX: Kings or Fisher type (photo shows the Kings type)

Tracker: Provides one channel of intercom (talk and listen) and tally signal.



REMOTE (12-pin): For stand alone camera control, simple remote control unit can be utilized.

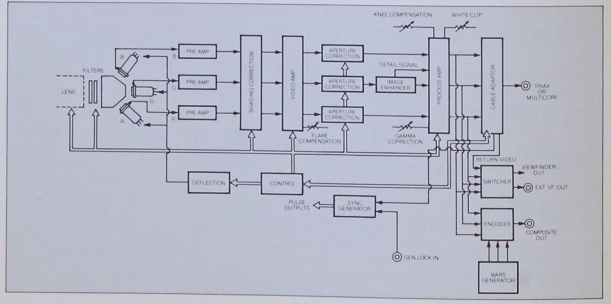
SCRIPT (4-pin): Power supply for script lamp. (approx. 5W)

COAX: Allows coaxial cable instead of triax cable to be used. All functions are available except power, which must be supplied locally.

RET CONTROL (6-pin): Remote control of return video selection is possible at the tripod pan bar.
At the same time, Intercom mic ON/OFF (both for Eng and PROD) control is possible.

MIC CH-1/CH-2: Two channel microphone inputs.

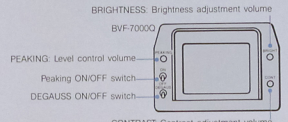
1-3. Basic block diagram



1-4 Viewfinder

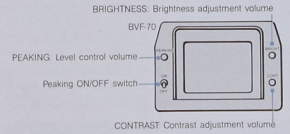
• BVF-7000Q 7-inch color viewfinder

Sony's advanced CRT technology achieves a high performance color viewfinder for the first time. For sports coverage or studio production, color viewfinder has been strongly demanded for a long time from many broadcasters. A new Super Fine Pitch Trinitron specially designed for this viewfinder is utilized and 350 TV lines resolution is achieved. R, G, B signals for camera output and composite signals for return video are viewfinder inputs. Dimensions and camera interface are compatible with BVF-70.



• BVF-70/70CE 7-inch monochrome viewfinder

The BVF-70/70CE provided with BVP-360 has center resolution of 800 TV lines.



• Indications in the viewfinder

This display is provided with various electronic indications. All of them can be switched off if desired. In addition, status and warning indications are displayed.

CENTER MARKER:

SAFETY ZONE:
Approx. 90% of the image is marked. (adjustable 80% to 90%)

ZOOM POSITION INDICATION:
ON/OFF switch is at circuit board.
Zooming status from 0% (minimum) to 80% (maximum length) can be indicated for camera operator's convenience.

BOX CURSOR:
ON/OFF switch is at camera head. This indication is very useful to confirm specified position in the image, and can be utilized for special effects with switcher, mixing of images, etc.

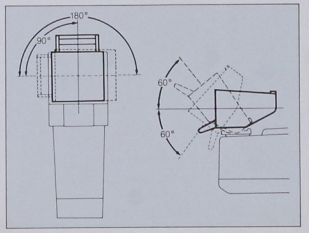
H-POSI, V-POSI:
These controls change the cursor position.
WIDTH, HEIGHT:
These controls change the size of cursor.

• Mixed video monitoring

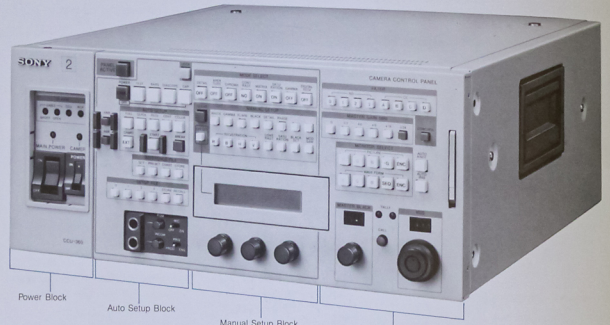
Return video to the viewfinder can be the choice of an external video feed or the output of the camera itself, or a mix of these two signals. Mix ON/OFF switch is selected by the camera operator.

• Viewfinder mechanism

The viewfinder mechanism has been optimized to permit smooth and wide range positioning and locking using one hand. It is tiltable from −60 to +60 degrees and rotatable ±90 degrees.
Installation of the viewfinder on the camera head is very simple and allows the camera to be carried by one person. No cable connection is required.



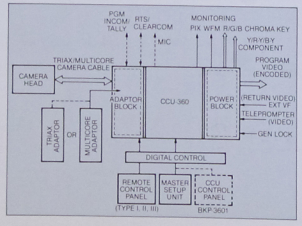
2. CCU-360/360P Camera Control Unit



Control Panel (BKP-3601) is optional.

2-1. CCU System configurations

The CCU-360 is composed of an adaptor block (triax or multicore), self-contained power block, main unit, and optional control panel. In the same way as camera head configurations, triax or multicore adaptors can be utilized and interchanged. The Power Unit contained in the CCU-360, provides internal power to the Triax/Multicore Adaptor, main unit and external power to the Camera Head (including AC power for zoom lens control) and Remote Control Panels. Colored LED's provide normal/abnormal power status indications.



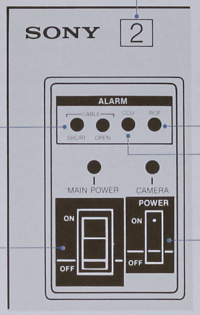
• System expansion with BVP-3A/30 as a portable partner

Using the new camera adaptor CA-31, the BVP-3A/30 high qualtiy portable camera can be added to a BVP-360 multi camera system. The CCU-360 controls the BVP-3A/30 via triax cable. Thus, Sony's total system concept enables you to make effective use of existing equipment with optimum performance.

CCU-360 BVP-3 with CA-31

2-2. Functions and controls

• Power block



Display of camera cable status
SHORT: Short circuit (Red LED)
OPEN: Open connection (Red LED)

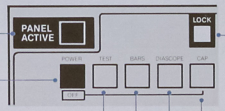
MAIN: Main power ON/OFF (camera and CCU/RCP)

RCP: Power alarm

CCU: Internal power alarm

CAMERA: Camera head power ON/OFF

• Camera output block



PANEL ACTIVE BUTTON: When lit, the CCU takes control from MSU or RCP.

CAMERA POWER OFF: When pressed simultaneously with "CAP" button, camera power is switched OFF. Low voltage still works for intercom system. When this is pressed camera power is switched ON.

LOCK: When pressed, all controls except for filters, master gain, monitor select, auto iris, iris and master black are inactive.

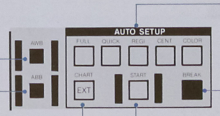
CAP: Iris closes and filter set to cap.

DIASCOPE: Built-in Diascope can be set.

BARS: SMPTE/EIA color bars EBU 75%/100% color bars

TEST: Test signal output

• Auto setup block



AUTO SETUP: Auto setup mode selection.
5 modes of FULL, QUICK, REGI, CENT, and COLOR.

AWB: Starts automatic white balance sequence.

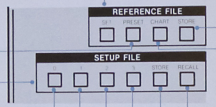
ABB: Starts automatic black balance sequence.

EXT CHART: External chart selection switch. Normally, internal diascope is selected automatically. When external chart is used for auto setup, press "CHART" for framing.

BREAK: Breaks auto setup routine and returns to previous condition.

START: Starts auto setup routine.

• Reference file controls



SET: Set command before/after producing a file data.

PRESET: Preset data (SONY standard) can be recalled when it is required for Auto Setup or producing reference file.

SETUP FILE CONTROLS Three setup files can be stored/recalled with the CCU control panel.

SETUP FILE NUMBER "0": This always stores auto setup data. This is also used as a clear function from other setup files back to the data.

STORE: Stores reference file.

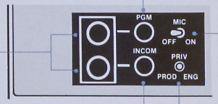
CHART: Press this button when reference file is to be made with external chart. A chart framing indication is present in viewfinder.

RECALL: Recall setup file

STORE: Store setup file

SETUP FILE number 1 ~ 3: Three setup files can be stored

• Intercom



PGM: Program audio level control

Double jack

MIC: Microphone ON/OFF switch for intercom

INCOM: Incom/Audio level control

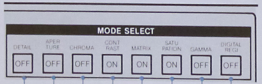
Two channel intercom

ENG: For engineer at camera head

PROD: For producer at camera head

PRIV: Private mode for off line communication between camera head and CCU. This is convenient for engineering discussion.

• Mode select switches



DETAIL OFF: Detail OFF when lit

APERTURE OFF: Aperture OFF when lit

CHROMA OFF: Chroma OFF when lit

CONTRAST ON: Contrast circuit function when lit

DIGITAL REGI OFF: When lit digital registration is OFF

GAMMA: Linear gamma when lit

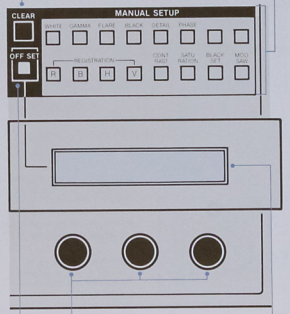
SATURATION: When lit, saturation of active picture area is variable ±3dB

MATRIX: When lit, matrix is ON

• Manual setup block and character display

CLEAR: To cancel all manual adjustments, press the CLEAR and WHITE (or other modes). The original setup file data (file No. "0") before manual adjustment will be recalled.
Additionally, when this is pressed simultaneously with FULL (in auto setup mode), ALL setup data is cleared. (set to +00)

MANUAL SETUP MODE SELECTION



ROTARY ENCODERS

LCD DISPLAY FOR EACH MODE
20 characters × 2 lines display.
(See the right chart for detail)

Auto setup status, file information, error message etc. are also displayed.

OFFSET: The display shows numbers in percentages for each column. The offset switch is used to enter offset values for easy computation.

For example:

White

R WHT	B WHT	G WHT
+55	+45	+35

Switch on OFFSET

R WHT	B WHT	G WHT
+00	+00	+00

Adjust 5% up

R WHT	B WHT	G WHT
+5	+5	+5

Switch off OFFSET

R WHT	B WHT	G WHT
+60	+50	+40

*When R-H, R-V, B-H or B-V for registration is selected, monitor selection switch in the other area will correspond to it automatically, and vice versa.

• LCD display

Switch	LCD control indications Range of adjustment			Note
WHITE	R WHT ±99	G WHT ±99	B WHT ±99	White balance adjustment
	±5.5dB	±5.5dB	±5.5dB	
GAMMA	R GAM ±99	G GAM ±99	B GAM ±99	Gamma correction
	±0.05	±0.05	±0.05	
FLARE	R FLR ±99	G FLR ±99	B FLR +99	Flare compensation
	±10%*	±10%*	±10%*	
BLACK	R BLK ±99	G BLK ±99	B BLK ±99	Black balance adjustment
	±20%*	±20%*	±20%*	
DETAIL	DTL ±99		APT ±99	Detail compensation and aperture correction adjustment
	−20dB - +6dB		−20dB - +6dB	
PHASE	SC ±180°	PHASE	H ±99	Phase adjustment for subcarrier and horizontal
	360°		0.5 - +3μsec	
REGI SET	CENT ±99	SKEW ±99	SIZE ±99	Registration compensation of R-H, R-V, B-H, B-V for Centering, Skew, and Size
	±1% of picture height is adjustable	±0.5%	±1%	
CON-TRAST	CONTRAST 0 - 99		KNEE ±99	Contrast adjustment and knee point control
	0 - +10dB		±20%	
SATU-RATION	SATURATION ±99			Saturation control for chroma signal
	±3dB			
BLACK SET	R SET ±99	G SET ±99	B SET ±99	Black set control
	±20%*	±20%*	±20%*	
MOD SAW	R SAW ±99	G SAW ±99	B SAW ±99	Modulation saw tooth control (at gamma ON)
	±10%*	±10%*	±10%*	

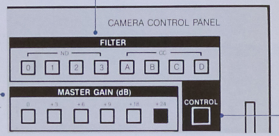
Most control indications are given as percentages and assume preset data as 0%.
*Unit of variable range is as follows.
PAL: 100% = 700mV
NTSC: 100% = 714mV = 100 IRE

Above controls are available at CCU control panel. The display above the three encoder dials is separated into three sections relating to each encoder. The selected controls and values are displayed as above. Camera manual setup becomes visual and simple with this digital display.

• Filter selection

ND FILTER/CC FILTER:

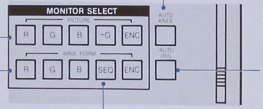
	0	1	2	3
ND Filters	CAP	CLEAR	1/4 (0.6 density)	1/16 (1.2 density)
Color Filters	A	B	C	D
	CROSS	3200°K	4300°K	6300°K



MASTER GAIN: Gain switches of 0/+3/+6/+9/+18/+24dB are provided.

CONTROL: Press to obtain filter control from Camera head.

• Monitor select switches



PICTURE: Signal selection for external picture monitor.

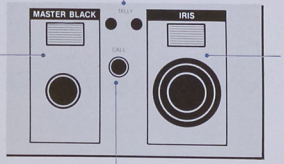
WAVEFORM: Signal selection for waveform monitor.
These two switche groups are active independently, even when panel is not active.

AUTO KNEE: Knee point is varied automatically according to the high-light content of picture. Manual control is possible when this is OFF and contrast compensation mode in manual setup block is selected.

AUTO IRIS: When lit, iris is automatic. Even in auto mode, approx. ±1F stop is manually controllable.

SEQ: Sequential output of R, G, and B with V blanking for waveform monitor.

• Iris and master black control



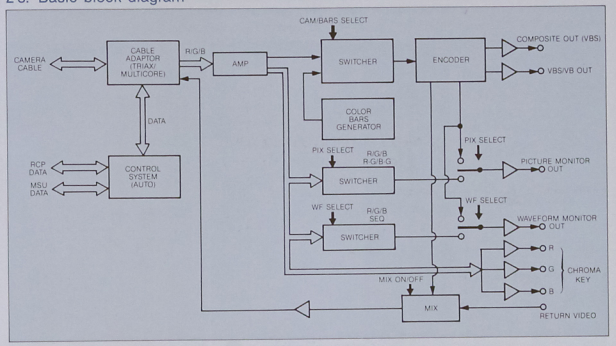
TALLY: Tally lamps

MASTER BLACK: Rotary Encoder for master black control. Indication is ±99%

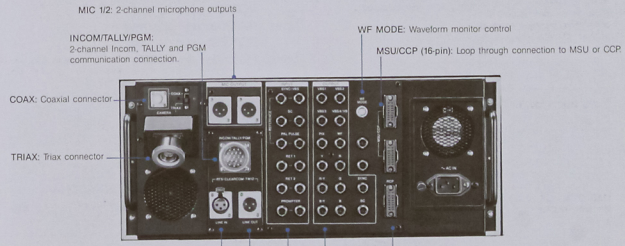
IRIS: Rotary Encoder for iris control. F number indicated is return signal from lens.

CALL: Call to draw attention of camera head operator. When pressed, tally lamps light at camera head.

2-3. Basic block diagram



2-4. Connections



MIC 1/2: 2-channel microphone outputs

INCOM/TALLY/PGM: 2-channel Incom, TALLY and PGM communication connection.

WF MODE: Waveform monitor control

MSU/CCP (16-pin): Loop through connection to MSU or CCP.

COAX: Coaxial connector

TRIAX: Triax connector

RTS/CLEARCOM-TW12 (XLR-3):
RTS or CLEARCOM Incom system connection

INPUT GEN LOCK:
SYNC/VBS: Sync signal or Video Burst Sync
SC: Sub carrier
PAL pulse: Line alternation Pal Pulse

RET 1/2 (BNC):
Return video connection for 2-channels

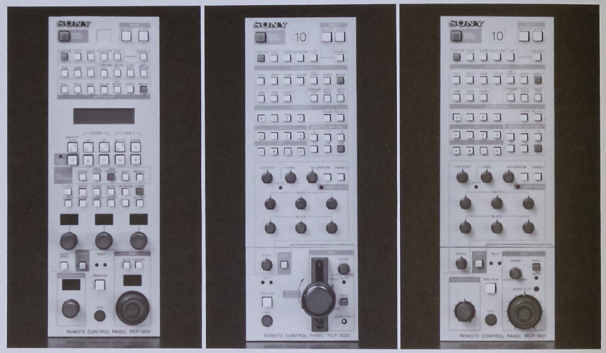
PROMPTER:
Prompter input

RCP (16-pin): RCP connection

OUTPUT
VBS 1/2/3 (BNC): Encoded video output
VBS4/VB (BNC): Encoded video output
PIX (BNC): Encoded video output for monitor
WF (BNC): Encoded video output for Waveform monitor
SYNC (BNC): Sync output
SC (BNC): Sub carrier output
R/G/B: R/G/B outputs
Y:
R-Y:
B-Y:
} Component video outputs

3. RCP Remote Control Panel

A range of remote video operational control panels is available to suit the wide range of applications and environments in which the BVP-360 can be used. Three types are available and the essential operating controls on the CCU can be delegated to the RCP for operational convenience.



Joy stick type iris/master black control and rotating type iris/master black control are available as follows.

Type-I RCP-3610 (joy stick type)*
RCP-3611 (rotating type)*
Type-II RCP-3620 (joy stick type)
RCP-3621 (rotating type)
Type-III RCP-3631 (dial type)

*will be available

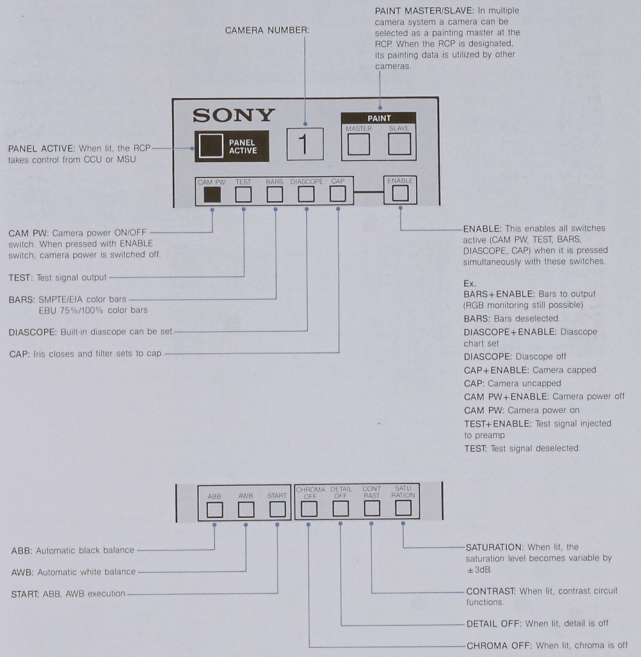
3-1. RCP function chart

	*Type I	Type II	Type III
White (RGB)	○	○	○
Black (RGB)	○	○	○
Gamma (RGB)			○
Flare (RGB)			○
Contrast	○	○	○
Knee	○	○	○
Saturation		○	○
Iris level control	○	○	○
Iris coarse			○
Iris sensitivity/range	○	○	
Master Black	○	○	○
Detail level control	○	○	○
Aperture control			○
H-cent (R, B)			○
V-cent (R, B)			○
Camera power	○	○	○
Cap	○	○	○
Test	○	○	○
Bars	○	○	○
Diascope		○	○

		*Type I	Type II	Type III
ND filter			○	○
CC filter			○	○
Master gain			○	○
Chroma off		○	○	○
Contrast ON				○
Saturation ON			○	○
Auto setup	full	○	○	○
	registration		○	○
	color balance		○	○
	auto centering	○	○	○
External chart		○	○	○
Auto white balance		○	○	○
Auto black balance		○	○	○
Auto iris		○	○	○
Auto knee		○	○	○
Call		○	○	○
Setup file control				○
Scene file control		○	○	○
Iris hold		○	○	

*Tentative

3-2. RCP-3631 (Type-III) functions and controls


CAMERA NUMBER
PAINT MASTER/SLAVE: In multiple camera system a camera can be selected as a painting master at the RCP. When the RCP is designated, its painting data is utilized by other cameras.
SONY
PAINT
MASTER
SLAVE
PANEL ACTIVE
1
CAM PW
TEST
BARS
DIASCOPE
CAP
ENABLE
PANEL ACTIVE: When lit, the RCP takes control from CCU or MSU
CAM PW: Camera power ON/OFF switch. When pressed with ENABLE switch, camera power is switched off.
TEST: Test signal output
BARS: SMPTE/EIA color bars
EBU 75%/100% color bars
DIASCOPE: Built-in diascope can be set.
CAP: Iris closes and filter sets to cap.
ENABLE: This enables all switches active (CAM PW, TEST, BARS, DIASCOPE, CAP) when it is pressed simultaneously with these switches.
Ex.
BARS+ENABLE: Bars to output (RGB monitoring still possible)
BARS: Bars deselected.
DIASCOPE+ENABLE: Diascope chart set
DIASCOPE: Diascope off
CAP+ENABLE: Camera capped
CAP: Camera uncapped
CAM PW+ENABLE: Camera power off
CAM PW: Camera power on
TEST+ENABLE: Test signal injected to preamp
TEST: Test signal deselected.
ABB
AWB
START
CHROMA OFF
DETAIL OFF
CONTRAST
SATURATION
ABB: Automatic black balance
AWB: Automatic white balance
START: ABB, AWB execution
SATURATION: When lit, the saturation level becomes variable by ±3dB.
CONTRAST: When lit, contrast circuit functions.
DETAIL OFF: When lit, detail is off
CHROMA OFF: When lit, chroma is off

• Auto setup block

EXT CHART: External chart selection switch. Normally, internal diascope is selected automatically.

START: Starts auto setup

BREAK: Breaks auto setup routine and returns to previous condition

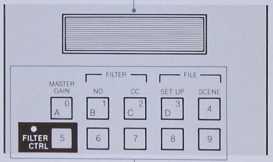
AUTO SETUP MODE SELECTION (FULL, REGI, CENT, COLOR MODES)

Display: Conditions of Master gain, filters (ND/CC) and file numbers are displayed.
In addition, auto setup status or error message, or file message can be displayed.

Display of control data

MASTER GAIN dB	ND FILTER NO.	CC FILTER NO.
SCENE FILE NO.	NEXT SCENE NO.	SETUP FILE NO.

• Filter and file controls



10 KEY AND SELECTION SWITCHES

- **MASTER GAIN/0/A:** Master gain mode selection switch and filter 0/A or file number 0.
- **ND/1/B:** ND filter control mode switch and filter 1/B or file number 1.
- **CC/2/C:** CC filter control mode switch and filter 2/C or file number 2.
- **SETUP/3/D:** Setup file mode selection switch and filter 3/D, or file number 3.
- **SCENE/4:** Scene file mode selection switch and file number 4.
- **FILTER CTRL/5:** Press to obtain filter control from Camera head. When lit, filter control is on this panel. Or file number 5.
- **6:** File number 6
- **7:** File number 7
- **8:** File number 8
- **9:** File number 9

Mode selection

M. gain (0, A): Master gain is selected and then required number can be input.
ex. for +9dB gain

M. GAIN 0 A + 9

ND (1, B): ND filter is selected and then required filter number can be input.
ex. for ND filter 1

ND 1 B + ND 1 B

CC (2, C): CC filter is selected and then required filter number can be input.
ex. for CC filter A

CC 2 C + M. GAIN 0 A

SETUP: SETUP (3, D) is selected for Setup file mode. Setup file operation should follow such as RECALL, CLEAR, numbers, etc.

SCENE: SCENE (4) is selected for Scene file mode.

FILTER CTRL: Filter control (5) is selected to obtain filter control. The LED above the switch lights.

*All these mode select operation is necessary as a first step.

The above six controls require a two step push.

• File operation

STORE: Store command switch for setup/scene file data.

DATA CLEAR: Clear painting function. All manually painted data can be erased and the camera returns to the previous Setup or Scene file by one key stroke. This is a very convenient function allowing the operator to perform experimental painting based upon selected file.
Also used for file data clear function.

RECALL: Recall command for Setup or Scene file.

NEXT: For scene file operation, the NEXT command recalls the next highest scene file data.

CMD CANCEL: Cancelling function for prior command such as STORE, RECALL, DATA CLEAR (file/paint) and NEXT (next file recall). This helps to recover from file command misoperation or incorrect input of data.

• Manual painting controls

WHITE: White balance adjustment (RGB)
BLACK: Black balance adjustment (RGB)

H-CENT: Horizontal centering (RGB)
V-CENT: Vertical centering (RGB)

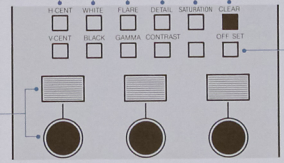
FLARE: Flare compensation (RGB)
GAMMA: Gamma correction (RGB)

DETAIL: Detail and aperture compensation
CONTRAST: Contrast and knee control

SATURATION: Saturation control of active picture area.

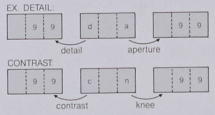
CLEAR: To cancel all manual adjustments, press the CLEAR and mode switch. The original setup file data (file number "0") before the manual adjustment will be recalled.

OFFSET: The display shows numbers in percentage for each column. The offset switch is used to enter offset values for easy computation.

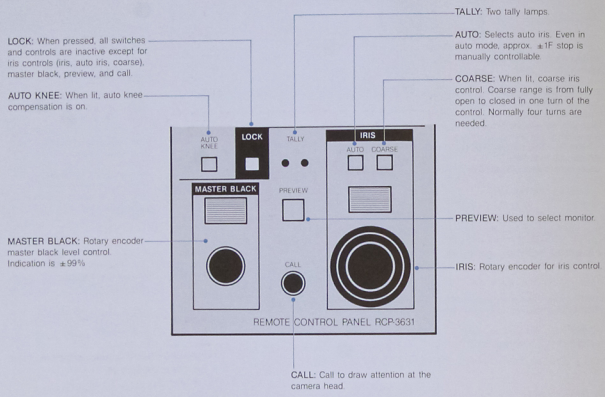


RGB encoder dials: Encoder dials for Red, Green and Blue are independently provided. The display and range of adjustment are similar to CCU control panel.

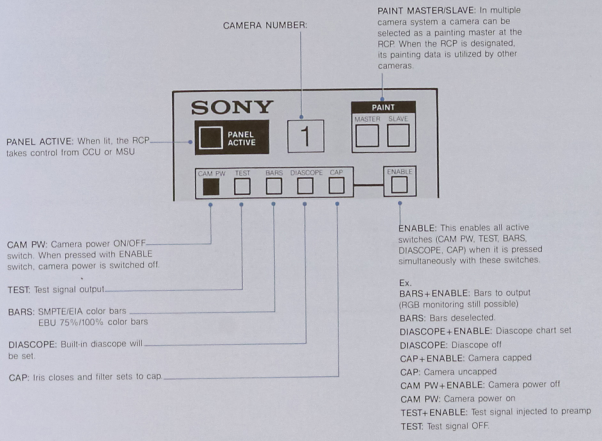
Display: 3 character display for each encoder dial.



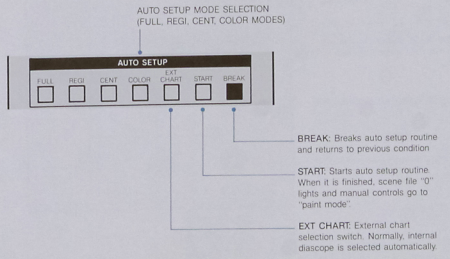
• Iris and master black controls


LOCK: When pressed, all switches and controls are inactive except for iris controls (iris, auto iris, coarse), master black, preview, and call.
AUTO KNEE: When lit, auto knee compensation is on.
MASTER BLACK: Rotary encoder master black level control. Indication is ±99%
TALLY: Two tally lamps.
AUTO: Selects auto iris. Even in auto mode, approx. ±1F stop is manually controllable.
COARSE: When lit, coarse iris control. Coarse range is from fully open to closed in one turn of the control. Normally four turns are needed.
PREVIEW: Used to select monitor.
IRIS: Rotary encoder for iris control.
CALL: Call to draw attention at the camera head.
AUTO KNEE
LOCK
TALLY
IRIS
AUTO
COARSE
MASTER BLACK
PREVIEW
CALL
REMOTE CONTROL PANEL RCP-3631

3-3. RCP-3621/3620 (Type-II) functions and controls


CAMERA NUMBER:
PAINT MASTER/SLAVE: In multiple camera system a camera can be selected as a painting master at the RCP. When the RCP is designated, its painting data is utilized by other cameras.
SONY
PANEL ACTIVE
1
PAINT
MASTER
SLAVE
CAM PW
TEST
BARS
DIASCOPE
CAP
ENABLE
PANEL ACTIVE: When lit, the RCP takes control from CCU or MSU
CAM PW: Camera power ON/OFF switch. When pressed with ENABLE switch, camera power is switched off.
TEST: Test signal output.
BARS: SMPTE/EIA color bars
EBU 75%/100% color bars
DIASCOPE: Built-in diascope will be set.
CAP: Iris closes and filter sets to cap.
ENABLE: This enables all active switches (CAM PW, TEST, BARS, DIASCOPE, CAP) when it is pressed simultaneously with these switches.
Ex.
BARS+ENABLE: Bars to output (RGB monitoring still possible)
BARS: Bars deselected.
DIASCOPE+ENABLE: Diascope chart set
DIASCOPE: Diascope off
CAP+ENABLE: Camera capped
CAP: Camera uncapped
CAM PW+ENABLE: Camera power off
CAM PW: Camera power on
TEST+ENABLE: Test signal injected to preamp
TEST: Test signal OFF.

• Auto setup block (RCP-3621/3620)


AUTO SETUP MODE SELECTION (FULL, REGI, CENT, COLOR MODES)
AUTO SETUP
FULL
REGI
CENT
COLOR
EXT CHART
START
BREAK
BREAK: Breaks auto setup routine and returns to previous condition
START: Starts auto setup routine. When it is finished, scene file "0" lights and manual controls go to "paint mode".
EXT CHART: External chart selection switch. Normally, internal diascope is selected automatically.

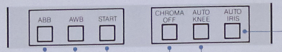


ABB: Automatic black balance

AWB: Automatic white balance

START: ABB, AWB execution

AUTO IRIS: When lit, iris is automatic. Even in auto mode, approx. ±1F stop is manually controllable.

AUTO KNEE: Knee point is automatically varied according to the high light content of picture. Manual control is possible when this is OFF at manual setup area.

CHROMA OFF: When lit, chroma is off.

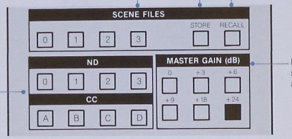
• Filter, file, and master gain controls (RCP-3621/3620)

SCENE FILES:

Scene file: "0" always stores auto setup data. Lamp lights whenever auto setup is performed. Also used as a clear function from other scene files back to data. Three scene files are available by using No. 1~3.

STORE: Stores scene file

RECALL: Recalls scene file



MASTER GAIN: Master gain switches of 0, +3, +6, +9, +18, and +24dB.

ND/CC FILTER CONTROLS

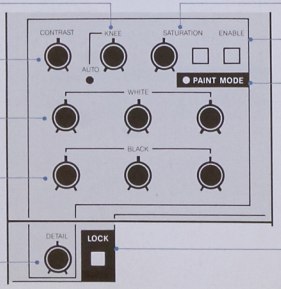
ND FILTER/CC FILTER:

ND Filters	0	1	2	3
	CAP	CLEAR	1/4 (0.6 density)	1/16 (1.2 density)
Color Filters	A	B	C	D
	CROSS	3200°K	4300°K	6300°K

• Manual painting block (RCP-3621/3620)

KNEE: Active when auto lamp is off.

SATURATION: Active when lamp lit.



CONTRAST: Contrast adjustment control. Fully counterclockwise is off.

WHITE: White balance control (RGB)

BLACK: Black balance control (RGB)

DETAIL: Detail level control.

ENABLE: When lit, all manual controls can be used. When off, all paint data is locked.

PAINT MODE: After auto setup is performed, or a scene file is recalled, the panel automatically goes into paint mode. All these control dials are temporarily set to setup file data and camera control is based on this value.

Press the lit file number to deactivate paint mode.

LOCK: When pressed, all switches and controls are inactive except Iris control (iris range, sensitivity, hold, auto iris) master black, preview, and call.

• Iris and master black controls (RCP-3620)

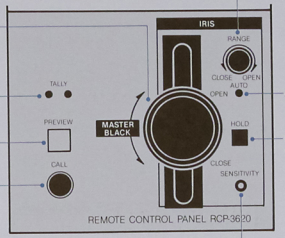
RANGE: This knob sets the range of the F stop at the center position of the control. (from close to open)

MASTER BLACK: Master black control dial.

TALLY: Two tally lamps

PREVIEW: Used to select monitor

CALL: Flashes tally lights



AUTO: Lights when auto iris mode

HOLD: Holds the iris level, and no manual adjustment is possible. The panel goes into HOLD mode whenever auto iris is deselected. After this the HOLD switch must be pressed to allow manual iris control. The iris dial shows absolute position value, and the HOLD mode prevents a radical change in iris.

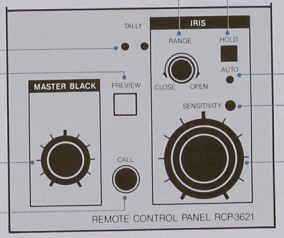
SENSITIVITY: This varies the range of adjustment of iris control. (From fine to coarse adjustment)

• Iris and master black controls (RCP-3621)

RANGE: This knob sets the range of the F stop at the center position of the control. (from close to open)

TALLY: Two tally lamps

PREVIEW: Used to select monitor



HOLD: Holds the iris level, and no manual adjustment is possible. The panel goes into HOLD mode whenever auto iris is deselected. After this the HOLD switch must be pressed to allow manual iris control. The iris dial shows absolute position value, and the HOLD mode prevents a radical change in iris.

AUTO: Lights when iris is in auto mode.

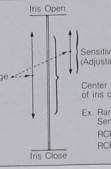
SENSITIVITY: This varies the range of adjustment of the iris control. (From fine adjustment to coarse adjustment)

MASTER BLACK: Potentiometer for Master black control. Indication is ±99%.

CALL: Flashes tally lights

Potentiometer for iris control. Range of adjustment and position of adjustment can be varied.

IRIS CONTROL: By sensitivity and range



Center position and sensitivity of iris control can be varied.

Ex. Range: F4
Sensitivity: ±1F stop
RCP-3620 Joystick full movement gives F2.8 - F5.6 variation.
RCP-3621 One full turn of the control gives F2.8 - F5.6 variation.

4. Auto Setup Function

4-1. Concept of auto setup system

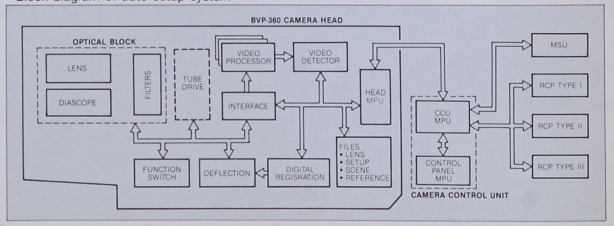
- Not "A full computer monster" but "A computer supported camera"
- Intensive attention to the parameters which truly need automation
- Stable and reliable camera circuit, therefore no need to compensate drifts but to enable quick camera setups

The design approach for the BVP-360 automatic systems enjoyed both the benefits of our careful examination of the different approaches adopted by other new generation cameras—and a new high sophistication in LSI chip implementation, and accompanying software design. Sony's concept of Auto Setup system can be described as an optimum compromise between stability and the need for automation in the complicated camera setup process. Circuit stability and reliability are considered the first priority. In other words, the auto setup function does not aim to compensate drifts, but to make easier and quicker setup using microprocessors.
For multiple camera operation in studios, all necessary controls are provided at each operational area. Designed for flexible operation and versatile system application, Sony provides simple and sophisticated product configurations. Besides the five auto setup modes available, the convenient filing system is another advantage.

	Tube drive	RGB video processing	Composite video processing
PRESET (Manual)	RGB beams; beam set ABO gain ABO set beam alignment beam focus	axis shading modulation shading	Black clippers White clippers
AUTO SETUP	RGB scanning; centering (H,V) size(H,V) skew (H,V) Digital registration compensation	video level flare gamma black level vertical modulation	master black black set

The very best modern components (optical, mechanical and electrical) have been incorporated into the basic BVP-360, and these, combined with sophisticated feedback circuit techniques, provide the camera with a very high degree of inherent stability. Automatic setup systems are used to cater for these subsystems setups which employ a multiplicity of adjustments in the categories requiring periodic attention.
Sony carefully examined camera setup and adjustments and separated them into two categories; those which are preset when major components, such as pick up tube assemblies, are changed and which require no further routine adjustment—and those controlling very sensitive parameters, of a complex interactive nature, which call for periodic scrutiny.

• Block diagram of auto setup system



4-2. Features of auto setup system

- Features of auto setup system
1. Five auto setup modes for convenience and versatile operation.
2. Newly developed Digital Registration Compensation circuit assures precise registration adjustment.
3. Selectable diascope and external chart to meet users' requirement.
4. Custom reference data file capability for engineers' convenience.
5. Real time compensation to maintain alignment with change of lens parameters.
6. Simultaneous speedy setup capability for multi camera configuration of up to 8 cameras.

• 5 modes: auto setup
The following five setup modes can be selected according to the particular operational situation.
1. Full: All automatic setup functions for registration compensation and color balance, including all functions of mode 2 to 5.
2. Quick: All automatic setup functions except digital registration compensation.
3. Registration: Performs full registration compensation.
4. Centering: Automatic centering function.
5. Color balance: Automatic black/white balance, flare, gamma, etc.

y: yes

	FULL	QUICK	REGI	COLOR	CENT
White (RB)	y (RGB)	y		y	
Black (RB)	y (RGB)	y		y	
Gamma (RB)	y (RGB)	y		y	
Flare (RB)	y (RGB)	y		y	
Master black	y	y		y	
Black set	y	y		y	
V-Mod shading (RGB)	y	y		y	
H-cent (RB)	y	y	y		y
V-cent (RB)	y	y	y		y
H-size (RB)	y	y	y		
V-size (RB)	y	y	y		
H-skew (RB)	y	y	y		
V-skew (RB)	y	y	y		
Digital registration	y		y		

A diascope built-in to an exclusive zoom lens is normally used for auto setup modes. However, an external setup chart can be selected if the customer desires and used for all the above setup functions. White balance and Black balance are also possible with separated switch operation.

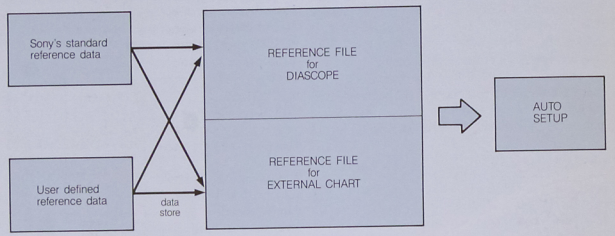
• Access for auto setup

	Camera	CCU	MSU	RCP.I	RCP.II	RCP.III
Full	y	y	y	y	y	y
Quick	y	y	y			
Regi	y	y	y		y	y
Color	y	y	y		y	y
Cent	y	y	y	y	y	y
Ext chart	y	y	y	y	y	y
Start	y	y	y		y	y
Break	y	y	y		y	y
Reference file set		y	y			

• Real time compensation
Apart from auto setup functions, compensation for registration error, color balance error, etc. caused by using extenders, or by control of lens zooming and focusing, are performed in real time.
- White (R, B)
- V-modulation shading (R, G, B)
- H-size (R, B)
- V-size (R, B)

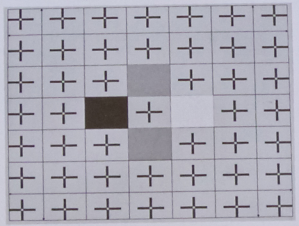
• Digital registration compensation
This circuit performs registration adjustment digitally by dividing the screen into 49 sections (7×7). Thus, precise and simple zonal registration compensation is assured.

4-3. Reference file system (Standard setup data system)

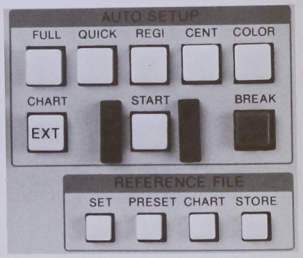


- Sony's standard reference data is factory preset data.
- Users can define and store their own reference data based on their own chart.
- Diascope is built into Sony exclusive lenses and an external chart is also supplied with BVP-360.

Built-in diascope/External chart



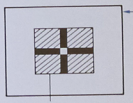
In auto setup mode, a reference file is necessary, and used automatically when auto setup is commenced. Without some reference data, the auto circuit cannot make decisions on how to set the camera. For example, in setting "Black level" the auto setup function makes each RGB channel gain conform to the preset signal level. Reference file for auto setup is the source of standard signal data required for auto setup functions. In the BVP-360, the REFERENCE FILE already contains Sony's standard reference data and this can be used for the Diascope or the External chart. The reference file data can be changed manually and adjusted by users. Technical engineers can manually setup and store their own data both for Diascope and External chart. The data stored in a reference file can be recalled automatically when the technical operator initiates auto setup.



4-4. Digital registration compensation

The digital registration compensation circuit executes precise registration adjustment at 49 addresses. This is a sequential automatic adjustment for Red and Blue signals relative to the Green signal, which is used as reference.
One address is 1/49 of full screen and the compensating window is 1/4 of each block. The circuit process is by pulse edges and interpolation of the compensation data between adjacent addresses (both vertically and horizontally) is made by calculation.

Window for centering



1/4 of one address.

Sequential process

1	8	15	22	29	36	43
2	9	16	23	30	37	44
3	10	17	24	31	38	45
4	11	18	25	32	39	46
5	12	19	26	33	40	47
6	13	20	27	34	41	48
7	14	21	28	35	42	49

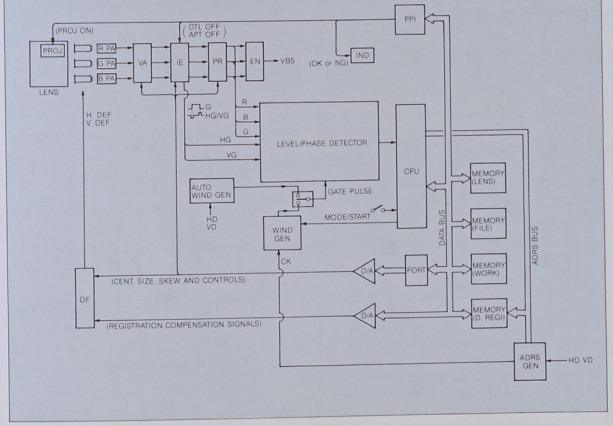
Diascope

• Basic process

Sequential centering for 7 addresses in vertical for RV (red-vertical) is made and then for BV (blue-vertical) in the same window. The sample is hold until the centering of all 7 addresses is completed.
After completion of one vertical line (7 addresses), the next line is processed in the same way.
After all vertical centering adjustment for Red and Blue is completed, horizontal adjustment for Red and Blue is made in the same sequence.

Centering	Addresses
Red Vertical	1→7
Blue Vertical	1→7
↓	
Red Vertical	8→14
Blue Vertical	8→14
↓	
Red Vertical	15→21
Blue Vertical	15→21
⋮	
Red Horizontal	1→7
Blue Horizontal	1→7
↓	
Red Horizontal	8→14
Blue Horizontal	8→14
⋮	
Red Horizontal	43→49
Blue Horizontal	43→49

BASIC BLOCK DIAGRAM OF DIGITAL REGISTRATION



4-5. File system and concept of camera setup

The BVP-360 is provided with three filing facilities to support camera system operation.

The setup file is to obtain basic camera setting. It is mainly utilized by camera engineers. For daily camera setup, or resetting according to weather or lighting conditions, eight setup files are available. Whenever Auto Setup is executed, the data is stored in the No. "0" setup file. Other setup file data can be produced and stored using number 1~7, to conform to critical technical alignment. The number "0" file can be used to clear data.

The scene file is to produce aesthetic images and desired special effects by optimizing all the available camera controls. It is mainly useful for operators to make color painting. The "0" number file always has auto setup data and can be used to clear data.

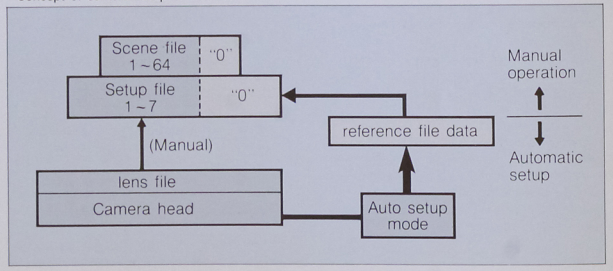
The lens file provides a readout of the various lens size data and compensates white balance, vertical modulation shading and horizontal/vertical size.

• File chart

Filing item	Setup	Scene	Lens	Reference*
Analog functions				
White (RGB)	yes	yes	yes	yes
Black (RGB)	yes	yes		yes
Gamma (RGB)	yes	yes		yes
Flare (RGB)	yes	yes		yes
Contrast	yes	yes		
Iris	yes	yes		
Master black	yes	yes		
Detail	yes	yes		
Aperture	yes	yes		
Master knee	yes	yes		
Saturation	yes	yes		
Black set (RGB)	yes			
V mod shading (RGB)	yes		yes	yes
H-cent (RB)	yes	yes		yes
V-cent (RB)	yes	yes		yes
H-size (RB)	yes		yes	yes
V-size (RB)	yes		yes	yes
H-skew (RB)	yes			yes
V-skew (RB)	yes			yes
Switch functions				
Cap	yes	yes		
Test	yes	yes		
Bars	yes	yes		
ND filter	yes	yes		
CC filter	yes	yes		
Master gain	yes	yes		
Detail off	yes	yes		
Contrast on	yes	yes		
Auto knee on	yes	yes		
Aperture off	yes			
Digital regi off	yes			
Matrix off	yes			
Gamma off	yes			
Saturation off	yes	yes		
Chroma off	yes	yes		
Setup file	—	yes	—	

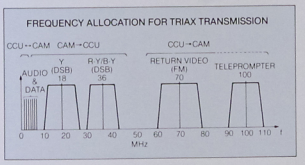
*Reference file data is the standard data memory for auto setup mode.

• Concept of camera setup in BVP-360



5. Triax Transmission

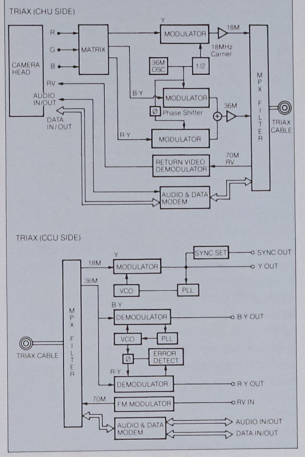
The BVP-360 employs Triaxial transmission between the camera head and Base Station when long cable runs are required. The Triax system is a state of the art design which transmits three video component signals to the Base Station. The components have been chosen as Y, R-Y, and B-Y. The Luminance Y signal is wideband (7.0MHz) signal and has the advantage of avoiding differential time delays that can arise with RGB systems. The color difference signals have 3.5MHz bandwidth and are transmitted as quadrature modulation of a signal carrier, thus providing high efficiency in spectrum utilization. All components employ full double sideband amplitude modulation with synchronous detection. This affords maximum signal-to-noise ratio and optimum high frequency transient response. The use of only two carriers for a wideband Y, R-Y and B-Y video also permits adequate spectrum separation for high performance filtering. The result is a highly transparent video transmission system and excellent Chroma key capability from the decoded RGB outputs.



Features

- Wide band luminance and color difference signals
- No compromise on facilities over multicore
- 2 full program audio channels to CCU
- 2 intercom channels and a program audio channel to camera head
- Teleprompter facilities
- Maximum cable length 2400 meters (14.5ømm cable)
- Component signal transmission meets future signal processing demands
- AC-240V can be transmitted to permit AC power utility at camera head.

Basic Triax System Diagram



The following specifications apply to a triax system between camera head and CCU.

Cable type	TRIAX CABLE			
Cable length	100 Meters		2400 Meters	
Signal component	Y	R-Y B-Y	Y	R-Y B-Y
Frequency response: 60Hz to 2MHz ±	—	0.5dB	—	1.0dB
60Hz to 5MHz ±	0.5dB	—	1.0dB	—
Linear waveform distortion: 2T pulse	1.0%	—	1.5%	—
Non-linear distortion: LINE TIME NON LINEARITY (measured with 5 riser staircase) (All APL's)	2%	—	3%	—
Signal to noise ratio: Y: Unweighted 100kHz to 4.2MHz	60dB	—	53dB	—
C: Unweighted 100kHz to 3MHz	—	57dB	—	50dB

6. Superiority of F1.2 Prism System

Owing to the innovative development of the F1.2 prism system, sensitivity and depth of field performance of 2/3-inch tube camera have been greatly improved. Thus the BVP-360 is suitable for studio and OB use.
When the size of the pickup tube, which means the effective size of the image, is made smaller, the specifications of the lens and color-separation prism have to change. The focal length must become shorter to obtain an angle of view equivalent to larger tube cameras. In the same way, a lens with greater maximum aperture is required to make equivalent sensitivity and depth of field possible.

6-1. Sensitivity

The aperture should be equivalent to an F2.1 prism in a 1-1/4" camera, an F1.6 prism in a 1" camera, and an F1.1 prism in a 2/3" camera to obtain the same incident light flux (optical sensitivity).
When only optical conditions are taken into consideration, the sensitivity of the 2/3-inch tube camera with F1.2 compared with F1.1 (ideal aperture) is 0.84. When we consider the condition of tube drive and signal current, the 2/3-inch tube camera has 50% higher sensitivity than a 1-inch tube camera. This is because the typical signal current to produce 1 Vp-p standard video signal from a 1-inch tube is 300nA, and from 2/3-inch tube, 200nA, when S/N ratio, lag, etc. is considered.
Therefore, total camera sensitivity of a 2/3-inch tube camera with F1.2 is 28% higher than that of a 1-inch tube camera.

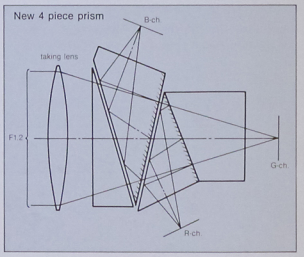
6-2. Depth of field

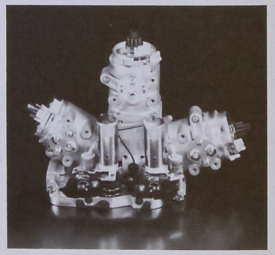
The same depth of field can be obtained from cameras with different size tubes, only when both angle of view and the optical sensitivity of the cameras are equivalent.
In other words, when focal length of a 2/3-inch camera and a 1-inch camera is set at the same angle of view the F1.1 optical system is ideal for a 2/3-inch tube camera to have the equivalent depth of field to a 1-inch tube camera with F1.6 system. By adoption of F1.2 optical system, the BVP-360 achieved almost the same depth of field as that of larger tube cameras (only 5% difference).

Tube size	Equivalent aperture	Existent		Optical sensitivity (normalized)	Depth of field (normalized)	Signal current	Camera sensitivity
		Lens	Prism				
1 1/4"	F2.1	F2.1	F2.0	1	1	300nA	1
1"	F1.6	F1.6	F1.6	1	1	300nA	1
2/3", conventional	F1.1	F1.6	F1.4	0.47 (with F1.6 lens)	1.54 (deeper)	200nA	0.7
2/3", with New prism and J40X lens	F1.1	F1.2	F1.2	0.84	1.05	200nA	1.28

• 4-piece beam splitting prism

In a conventional prism system, F1.4 has been a maximum F number in terms of beam splitting with a 3 piece prism block. A new prism system with a 4 piece prism block is incorporated in the BVP-360 optical system. This permits the use of F1.2 lens (the faster F number) which accepts large angle light rays.





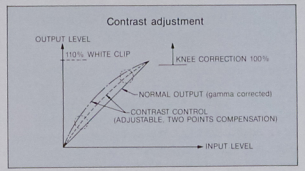
7. BVP-360 Signal Processing

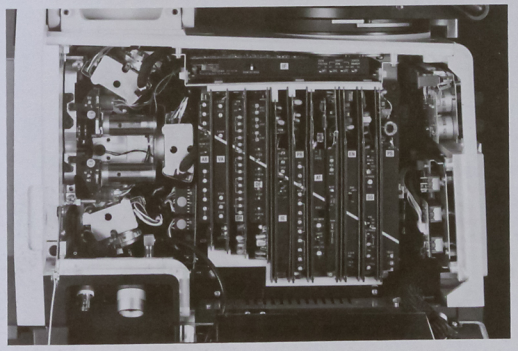
7-1. Wide dynamic range

The BVP-360 has a dynamic range of 600% excessive light input. Auto knee and pre-knee control efficiently processes the signal level.
The knee point can be manually changed according to the highlight content of the picture.
In case of shooting a figure in front of a window, or base ball game in shadows, this enables detail to be seen in the highlights.
Automatic knee control can be selected.

7-2. Precise color adjustments

- **Gamma:** Independent gamma adjustments of R, G, and B signals are available from the CCU control panel and RCP Remote Control Panel. The range of adjustment is ±0.1.
- **Saturation:** Saturation controls the amount of color signal up to ±3dB.
- **Contrast:** Besides the knee and gamma correction, output level can be controlled by the CONTRAST circuit. This boosts black level and suppresses white level. The circuit includes 2 points for adjustment control as shown in the figure. As a result, a finer and more crisp image can be obtained which shows more black image and white image detail in the picture. The location of two points of adjustment can be varied on the printed circuit board. Range of adjustment is up to 10dB. The processing occurs in the coder to ensure that saturation remains constant.



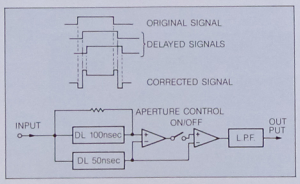


7-3. Aperture correction and image enhancement

The BVP-360 adopts both Aperture correction and Detail control (image enhancement). This 2-way processing method achieves more natural and crisp image and provides versatile image production control.
Aperture correction and image enhancement processing are performed with the IE-8 board which is between VA (video amp) and PR (process amp) board.
Basic circuit of them can be described as follows.

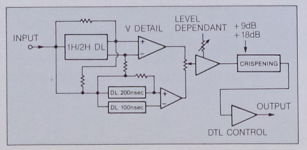
• Aperture correction

Basically, input signal from VA goes through 100nsec and 50nsec Delay Lines and 10MHz center equalization for aperture correction in produced. Control of adjustment is at CCU or RCP control panel. Range of adjustment and detailed operational information are described on the page of CCU control panel.

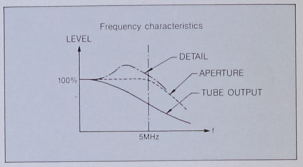


• Detail compensation (image enhancement)

Image enhancement can also be controlled in the same way as aperture correction. For vertical enhancement, a newly developed Delay Line is utilized and for horizontal enhancement, 3.5MHz center equalization is produced. Basic block diagram of this circuit is described.



As a result frequency characteristics are shown as follows.
Both aperture correction and detail compensation can be switched off.



8. Intercom/Audio System

• Audio system

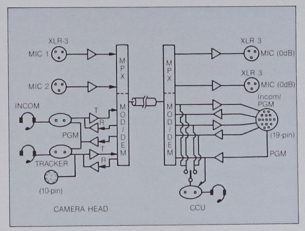
A two channel microphone system accepts two −60dB audio level inputs at the camera head and 0dB output can be obtained from the CCU. This is provided with Triax or Multicore system.

• Two channel intercom system

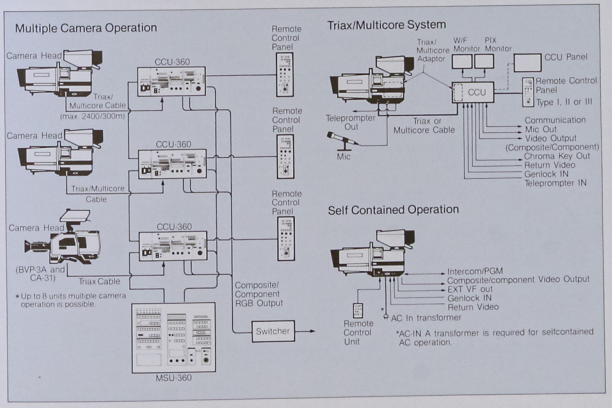
A two-channel intercom system between camera head and CCU, and 1-channel of program audio from the CCU to the camera head are provided, both via double jack. Either 4-wire or RTS/clearcom operation of the intercom system can be selected, in Triax or Multicore.

• RTS intercom system

The most advanced intercom system, the RTS system can be interfaced, if required, by built in connector.

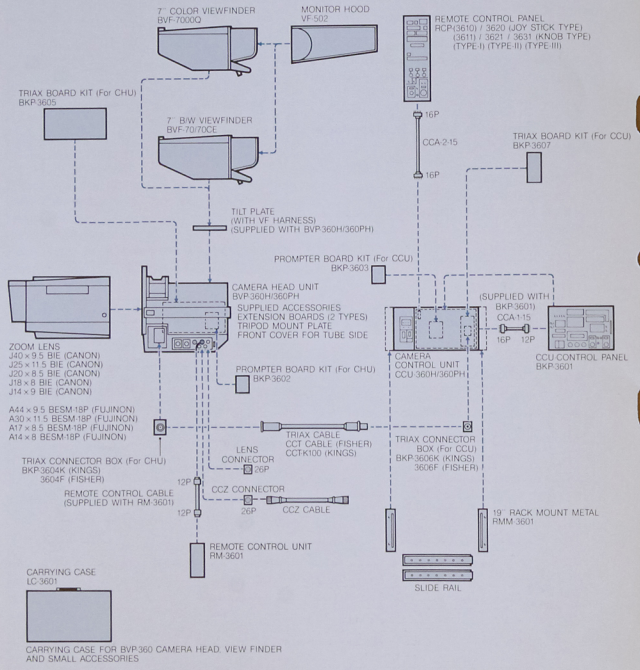


9. Application Systems



10. Products Configurations

• BVP-360/360P standard and optional accessories



	Model name	Description
Camera	BVP-360/TP	Camera Head Unit with PbO tube (BVP-360H) Triax Connector Box (BKP-3604K Kings type for NTSC) (BKP-3604F Fisher type for PAL) Triax Board Kit (BKP-3605) Tilt Plate (with VF harness) Supplied accessories —extension boards (2 types) —tripod mount plate —front cover for tube side
Camera control unit	CCU-360/T	Camera Control Unit (CCU-360H) Triax Connector Box (BKP-3606K Kings type for NTSC) (BKP-3606F Fisher type for PAL) Triax Board Kit (BKP-3607) Blank Panel Supplied accessories —extension boards (2 types) —AC Power Cord —Connector (4P for WFM control) *CCU control panel (BKP-3601) is not included in the CCU-360/360P as standard
Optional accessories	BVF-70/70CE (EIA) (CCIR)	7" B/W Viewfinder
	BVF-7000Q	7" Color Viewfinder (NTSC/PAL/SECAM can be selected automatically)
	VF-502	Monitor Hood (Outdoor Viewfinder Hood)
	RM-3601	Remote Control Unit (including 12P-12P cable)
	BKP-3601	CCU Control Panel (including CCA-1-15, 16P-12P/15m)
	RCP-3610 RCP-3620 RCP-3611 RCP-3621 RCP-3631	Remote Control Panel (TYPE I), Joy Stick Type Remote Control Panel (TYPE II), Joy Stick Type Remote Control Panel (TYPE I), Knob Type Remote Control Panel (TYPE II), Knob Type Remote Control Panel (TYPE III), Knob Type
	RMM-3601	Rack Mount Metal including: Adaptor with Handle×2 Bracket×2, Slide Rail×2
	LC-3601	Carrying Case
	CCT-Cables	Triax Camera Cable, Fisher type (50/100/150/300m)
	K-100	Triax Camera Cable (100m), Kings type
	CCZ-2	CCZ Cable (2m), 26P-26P
	CCZ-10	CCZ Cable (10m), 26P-26P
	CCA-2-30	Cable for Remote Control Panel (RCP-3610, 3620, 3611, 3621, 3631) (30m) 16P-16P
	BKP-3602	Prompter Board Kit (Demodulator)
	BKP-3603	Prompter Board Kit (Modulator)

*NOTE: The following models will be delayed for initial delivery.
RCP-3610, 3611: Remote control panel
RM-3601: Remote control box (including 12p cable)
BKP-3602: Prompter board kit
BKP-3603: Prompter board kit

11. Specifications

BVP-360/360P Camera Head

Pickup tube system		2/3-inch MS Plumbicon™ or MS "SATICON" 3-tube system
Optical system		F1.2 prism
Filter wheels	Color filters	A: CROSS B: 3200°K C: 4300°K D: 6300°K
	ND filter	0: cap 1: clear 2: 1/4 3: 1/16
Sensitivity (at 90% reflectance)		2000 lux with F4.5 typical (MS "PbO") 2000 lux with F4 typical (MS "SATICON")
Minimum subject illumination		Approx. 10 lux F1.2 +24dB gain (MS "PbO") Approx. 12 lux F1.2 +24dB gain (MS "SATICON")
S/N ratio		60dB (NTSC), 58dB (PAL)
Resolution		700 TV lines at center
Registration error		zone 1: 0.05% zone 2: 0.1% zone 3: 0.15%
Geometric distortion		1% (all zones)
Connectors	Outputs	Triax or Multicore AC utility out (AC 100/120/220/240V, 100W max.) *1Encoded video out (BNC): 1Vp-p, 75 ohms Ext VF out (BNC): 1Vp-p, 75 ohms Mic out Return video out (BNC): 1Vp-p, 75 ohms *2Prompter out (BNC): 1Vp-p, 75 ohms *2VTR (26-pin): CCZ type Script: 5W, 12V AC
	Inputs	Gen lock in: 1Vp-p, 75 ohms Mic in (2-ch, XLR 3-pin): −60dBs Remote: Simple remote control unit connector (12-pin) Ret cont: Return video selection connector (6-pin)
	*2Lens	Multi connector
	Tracker	Intercom use
	Incom/PGM audio (2-ch)	Double headset jack
*3Operating temperature		−20°C to 50°C (−4°F to 122°F)

*1 Encoded video out is available only when self contained camera operation.
*2 Optional
*3 In case of continuous operation under high temperature for long time, a camera might not conform to above specifications.

CCU-360/360P Camera Control Unit

Input signals (Triax/Multicore)	Return video 1 & 2 (BNC, bridge)	1Vp-p, 75 ohms
	Gen lock in	VBS/BS (BNC bridge): 1Vp-p, 75 ohms NTSC (0.286Vp-p, sync) PAL (300mVp-p, sync) Sync (BNC, bridge): 2Vp-p, 75 ohms SC (BNC, bridge): 1Vp-p, 75 ohms PAL pulse (BNC bridge): 2Vp-p, 75 ohms
	Prompter in (BNC, bridge)	1Vp-p, 75 ohms
	MSU/CCP	16-pin×2
	RCP	16-pin
Output signals	Encoded video out (BNC)	VBS: 1Vp-p, 75 ohms×3 VBS/VB: 1Vp-p, 75 ohms
	RGB video out (BNC)	0.714Vp-p, 75 ohms (NTSC) 700mVp-p, 75 ohms (PAL)
	Y/R-Y/B-Y out	Y: 1Vp-p, 75 ohms R-Y: 0.7Vp-p, 75 ohms B-Y: 0.7Vp-p, 75 ohms
	Waveform monitor out (BNC)	0.714Vp-p, 75 ohms (NTSC) 700mVp-p, 75 ohms (PAL)
	PIX (BNC)	1Vp-p, 75 ohms
	Sync out (BNC)	2Vp-p, negative, 75 ohms
	SC out (BNC)	1Vp-p, 75 ohms
	Waveform control (2-ch, XLR 3-pin)	0dB or −20dB
	4-pin	
Communications	PGM/Incom/Tally (19-pin)	PGM: 0dB/−20dB Incom: Two channels, 0dB Tally: DC 24V contact
	RTS/Clearcom/TW12	XLR 3-pin×2
	Incom/PGM	Double headset jack
Power requirements		AC 100/120/220/240V ±10%, 50/60Hz
Power consumption		Approx. 350VA
Operating temperature		0°C to 45°C (32°F to 113°F)

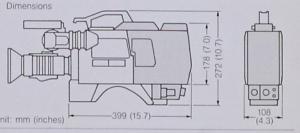
RCP Remote Control Panel

Connector	Type I	Type II	Type III
CCU connector	16-pin	16-pin	16-pin
Monitor out	6-pin	6-pin	6-pin

CA-31 Triax Camera Adaptor

Connectors	
Triax	Fisher or Kings
VTR (26-pin)	CCZ type
Mic in	XLR 3-pin 600 ohms, balanced
DC in	XLR 4-pin 10.5V-17V
Genlock in	BNC 1Vp-p 75 ohms
Incom/PGM	Double jack
Power consumption:	20W (connecting with triax cable, AC operation)
Weight:	Approx. 3.7 kg (8.2 lb)

Dimensions

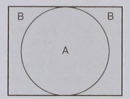


Unit: mm (inches)

Viewfinder

BVF-7000Q (color)

Screen size	120×90mm
CRT	7-inch 70-degree deflection Aperture grille pitch 0.20mm (center) 0.25mm (corner)
Color system	NTSC/PAL/SECAM (system can be selected automatically)
Power requirement	DC 10.0 to 17.0V DC 12.0V (typical)
Power consumption	50W (max.)
Input signal	RGB: (from camera out) R/B (non sync) 0.7Vp-p ±6dB 75-ohms terminated G (with sync) 1.0Vp-p ±6dB 75-ohms terminated Composite (return video): 1.0Vp-p ±6dB 75-ohms (sync negative) Tally indication: Lamp/red LED/green LED
Controls	Contrast/Brightness/Peaking Peaking SW/Degauss SW
Resolution	Center: More than 350 TV lines Corner: More than 300 TV lines
Frequency response	±1dB at 5MHz
Linearity	Within 1.5% in zone A
Stability of raster size	Within 1%
Convergence	Within 0.2mm in zone A Within 0.3mm in zone B



Color temperature	6500°K+8MPCD
Brightness	Maximum—more than 45 fL

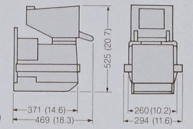
BVF-70/70CE (monochrome)

Screen size	120×90mm
CRT	7-inch monochrome 70-degree deflection
Resolution	800 TV lines at center 600 TV lines at corner
Geometry distortion	Within 1.0%
EHT voltage	14Kv typical
Power requirement	DC 10.0 to 17.0V DC 12V (typical)
Input video	1.0Vp-p ±dB sync negative 75 ohms terminated
DC restoration	Back porch type Back porch level within 1% of peak luminance from 10% to 90% APL

Design and specifications subject to change without notice.

Mechanical Specifications

Weight		
Camera head unit		Approx. 19 kg (41.9 lbs)
Utility power block		Approx. 2.8 kg (6.2 lb)
Viewfinder		BVF-7000Q Approx. 7 kg (15.4 lb) BVF-70/70CE Approx. 6 kg (13.2 lbs)
Viewfinder tilt plate		Approx. 1.9 kg (4.2 lbs)
Viewfinder hood		In door Approx. 0.4 kg (0.9 lb) Out door Approx. 0.7 kg (1.5 lb)
Camera plate		Approx. 1.8 kg (4.0 lb)
Wedge		Vinten Approx. 0.9 kg (2.0 lb) Shoutoku Approx. 0.6 kg (1.3 lb)
CCU		Approx. 30 kg (66.1 lb)
RCP Type I		Approx. 2.0 kg (4.4 lb)
RCP Type II	RCP-3620	Approx. 2.2 kg (4.9 lb)
	RCP-3621	Approx. 2.0 kg (4.4 lb)
RCP Type III	RCP-3631	Approx. 2.0 kg (4.4 lbs)
Dimensions		
Viewfinder		Approx. 260(W)×220(H)×390(D)mm (10.2×8.7×15.4")
CCU		Approx. 424(W)×177(H)×450(D)mm (16.7×7×17.7")
RCP (Type 1, 2, and 3)		Approx. 109(W)×310(H)×94(D)mm (4.2×12.2×3.7")
Camera head		



Unit: mm (inches)

• Available Lenses

CANON

	J40× 9.5BIE	J25× 11.5BIE	J20× 8.5BIE	J18× 8BIE	J15× 8.5BIE	J14× 9BIE
Focus length	9.5 - 380mm	11.5 - 288mm	8.5 - 170mm	8 - 144mm	8.5 - 128mm	9 - 126mm
Max. aperture	1 : 1.2	1 : 1.6	1 : 1.6	1 : 1.2	1 : 1.6	1 : 1.2
Zoom ratio	40×	25×	20×	18×	15×	14×
Mini. object distance	2.5m	1.5m	0.6m	0.6m	0.6m	0.7m
Weight (approx.)	30 kg	15 kg	9 kg	27 kg	9 kg	22 kg

FUJINON

	A44× 9.5BESM-18P	A30× 11.5BESM-18P	A17× 8.5BESM-18P	A14× 8BESM-18P
Focus length	9.5 - 420mm	11 - 330mm	8.5 - 145mm	8 - 112mm
Max. aperture	1 : 1.7	1 : 1.6	1 : 1.5	1 : 1.5
Zoom ratio	44×	30×	17×	14×
Mini. object distance	3.0m	2.4m	2.0m	1.6m
Weight (approx.)	13.5 kg	12 kg	13 kg	13 kg

Note
1. ANGENIEUX and SCHNEIDER lenses are also available.
2. For further information, please contact the lens manufacturer.

Sony Corporation

Printed in Japan © SONY